

# User's Guide

Second Edition

**Mobile Assistant® V**



**XYBERNAUT®**



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The Mobile Assistant® V, including all components, is not designed to be operated in an explosive atmosphere. If the user is in an explosive atmosphere, the unit should be removed from the area immediately.

**Interface Warning:** This personal computer is not manufactured to any specific software suite. There are various software packages and add-on hardware options available on the market; however, because the computer industry lacks standards in these areas, Xybernaut does not and cannot make any warranty or representation with respect to the performance of this product with any particular software packages and/or non-Xybernaut add-on hardware options. Therefore, Xybernaut hereby disclaims any representations or warranty that this product is compatible with any combination of products you may choose to connect. While Xybernaut representatives or Xybernaut authorized dealers may be able to assist you, and may make recommendations, they are NOT authorized to vary or waive this disclaimer.

Second Edition, September 2001

## SAFETY AND COMPLIANCE CERTIFICATIONS

The Xybernaut® Mobile Assistant® V (MA® V) mobile computer and Xybernaut branded peripherals are subjected to testing and quality controls to ensure that the devices will perform as set forth in the published specifications. All Xybernaut MAV mobile computers have been safety tested and designed to comply with the identified information technology standards. All Xybernaut MAV mobile computers and Xybernaut branded peripherals are certified to Underwriters Laboratories UL 1950 and Canadian Standards Association CAN/CSA C22.2 No 950. The Xybernaut MA V mobile computers and Xybernaut branded peripherals comply with IEC 60950 3rd edition with many country deltas.

## FCC CLASS B RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of FCC Rules. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference with radio communications. Operation of this device in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

## LIMITED WARRANTY

Xybernaut Corporation warrants that the hardware and software products it manufactures will be free of defects in materials and workmanship for a period of: a) one year from date of invoice for defects in materials, b) 90 days from date of invoice for defects in workmanship. This warranty is provided only to the original purchaser of the Xybernaut products including those end-users that purchase directly from an authorized Xybernaut reseller.

Should the product fail to conform to this warranty during the period set forth herein, Xybernaut Corporation will, at its option, repair or replace the product at no additional charge. As such, Xybernaut Corporation may exchange the product with a product that is new or which has been manufactured from new, reconditioned or re-manufactured parts. Xybernaut Corporation may, at its option, use new, reconditioned or re-manufactured replacement parts. All replacement products and parts will either assume the remaining warranty of the original product or be covered under warranty for 90 days, whichever period is longer.

To obtain service under this Agreement, owner should call Xybernaut's service provider, toll free, at 1-877-877-0297. Notice of warranty claims must be received before the expiration of the warranty period. If replacement or repair is necessary under the warranty, purchaser must return the unit within one year of the date of purchase. All products returned for repair or replacement under these warranty provisions must be accompanied by original purchaser's proof-of-purchase. Customer is responsible to pay shipping to Xybernaut on units being returned for warranty repair or replacement.

Should Xybernaut determine that equipment returned for warranty repair/replacement has been damaged or is malfunctioning as a result of misuse or reasons other than that covered by this warranty, Xybernaut will not repair or replace such equipment unless or until receipt of prepayment for repair/replacement costs and fees is received from the customer.

## **WARRANTY COVERAGE**

This warranty does not cover damage due to disassembly of product other than by an authorized Xybernaut technician; external causes including accident, abuse, neglect or misuse; problems with electrical power; servicing not authorized by Xybernaut; use not in accordance with product instructions or specifications and problems caused by components or parts not supplied by Xybernaut.

This warranty does not cover any items that are in one or more of the following categories: software not designed or manufactured by Xybernaut, accessories not manufactured by Xybernaut, including but not limited to hard hats, memory and hard drive upgrades, and components which are covered by third party manufacturer's warranties. Xybernaut will pass on to the original purchaser all transferable, third party manufacturer's warranties Xybernaut obtains on products purchased.

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This Limited Warranty does not cover labor performed for configuring software and virus detection. Removal and performance of such services will be subject to non-Warranty diagnostic and repair fees. Xybernaut Corporation is not responsible for repairs or defect testing of non-covered items.

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Xybernaut Corporation reserves the right to change its warranty policy at any time. Such new warranty shall immediately take effect and apply to products sold and distributed after the date of such change in warranty.

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## HEALTH AND SAFETY

Please review the following material carefully. Failure to follow the instructions, or failure to heed the warnings contained herein could lead to serious injury.

### All Components

Dismantling or opening the case will void warranty and may possibly cause electric shock. Avoid wet environments.

### Head-mounted Display (HMD)

Some people may experience eye fatigue or discomfort after using the HMD for an extended period of time. If you experience eye fatigue, nausea, dizziness, light-headedness, disorientation, or any other symptom that could be attributed to the HMD, stop using it immediately for a short period of time. Refer to the instructions that accompany your HMD to ensure that the unit is properly fitted and is properly adjusted. If the symptoms persist after normal use is resumed, stop immediately and consult a physician before continuing.

Never use the HMD when operating a motor vehicle or any other device or machinery that requires the use of both eyes. If you need to move or walk while wearing the HMD, always turn the HMD display unit away from the eye so that you have an unobstructed view of your surroundings prior to moving or walking. Remember that the HMD is tethered via a power cable to the CPU. Do not use the HMD in environments where any part of the HMD might get entangled with other objects, moving equipment or machinery. Do not use the HMD in situations where any obstruction to your view might cause harm or damage to yourself or others.

Epilepsy and seizures are experienced by a very small portion of the population. These affected individuals have a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are commonly present in our daily environment. Individuals that have not had any previous seizures may nevertheless have an undetected epileptic condition.

Discontinue the use of the HMD immediately and consult your physician if you experience any of the following symptoms while wearing the HMD: eye or muscle twitching, involuntary body movements, disorientation, loss of awareness of your surroundings, mental confusion, dizziness, sickness, and/or convulsions.

### Statement of Intended Use

The HMD should not be subjected to extreme environments and extra care should be taken in handling, packaging and shipping of the unit.

DO NOT use the HMD while operating any vehicle or other machinery. DO NOT use the HMD while maintaining or servicing equipment with moving parts which are exposed and present a hazard.

## LITHIUM-ION BATTERY SAFETY AND SPECIFICATIONS

When charged and discharged according to the instructions in this manual, the MA V's lithium-ion batteries are intrinsically safe.



*Always follow the charging procedures described in  
“Charging the Battery” on page 12 to assure safe  
operation.*

The MA V's batteries can be safely handled and stored within the following temperature guidelines.

Battery status	°F	°C
Discharged	+14 to +122	-10 to +50
Charged	+32 to +113	0 to +45
Stored	-14 to +140	-20 to +60

### Special Battery Cautions

The following are special precautions you should take when using and handling batteries.

- Do not expose batteries to direct sunlight or extreme heat
- Do not submerge batteries in liquid
- Do not incinerate batteries
- Do not handle damaged or leaking battery packs
- Do not attempt to discharge batteries by short-circuiting them
- Do not attempt to charge batteries with a charger other than one approved for use with the MA V.

# How to Use This Manual

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## ORGANIZATION

This User's Guide is organized in the following manner:

- **Chapter 1, Introducing the Xybernaut MA® V** — presents an overview of the uses for and the components of the MAV.
- **Chapter 2, Preparing the Xybernaut MA® V** — describes how to take the MAV from the box and put it to use in the most productive manner.
- **Chapter 3, Using the Xybernaut MA® V** — describes how to use the various components and peripherals that make up the MAV.
- **Chapter 4, Assembling the MA® V for Wear** — describes how to assemble the components of the MAV and how to wear them for mobile use.
- **Chapter 5, Caring for the MA® V** — describes how to care for and clean the MAV.
- **Chapter 6, Troubleshooting the MA® V** — describes how to troubleshoot the MAV.
- **Glossary**
- **Index**

## RELATED DOCUMENTATION

This User's Guide will help you make the most of your Xybernaut MAV. You should consult other related documentation including:

- Microsoft Windows documentation and on-line help
- LINUX documentation and on-line resources
- Head-mounted display documentation

## CONVENTIONS

This User's Guide uses the following conventions:



*This icon indicates an additional note relating to the MA V.*



*This icon indicates a tip that can help you to use the MA V more effectively.*



*This icon indicates a warning you should be aware of as you are using the MA V.*



*This icon indicates a reference to another document or to another section of this User's Guide.*

## Introducing the Xybernaut MA® V

The MA V is a compact, wearable PC designed to be body-worn, and interacted with using a digitizing Flat Panel Display (FPD), Head-mounted Display (HMD), voice, wrist-worn keyboard, and/or mouse. Information is viewed via the FPD or HMD.

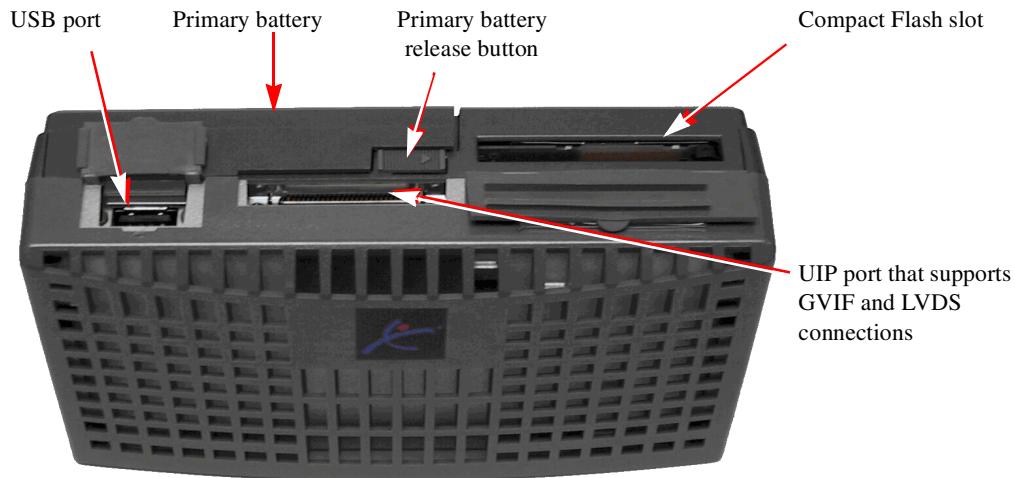
The following illustrations give you an overview of the MA V and its components.

## THE CENTRAL PROCESSING UNIT (CPU)

The MA V is a fully functional PC with a high-performance, ultra-low voltage Intel® Celeron® 500 MHz processor, available with 2 GB or 5 GB hard drive, up to 256 MB RAM, and a choice of operating systems including Windows 98®, Windows 2000®, or LINUX.

The CPU is the core of the MA V wearable computer. It contains ports to connect Xybernaut peripheral modules as well as industry-standard peripheral devices, such as flash memory or a digital video camera.

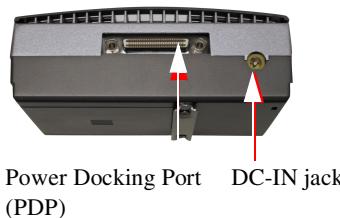
### Top view



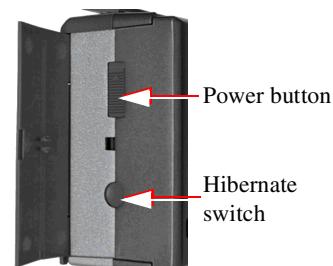
### Side view



### Bottom view



### Side view



The following table identifies the CPU's ports and the peripherals they support.

CPU Port	Typical Peripheral Device(s) Supported
<b>Universal Serial Bus (USB)</b>	Xyber® Key wrist-worn keyboard, external hard drive, and any other USB compatible device
<b>User Interface Port (UIP)</b>	Xyber® Panel flat digital panel display, Xyber® View head-mounted display
<b>Compact Flash</b>	Any Compact Flash compatible card
<b>Power Docking Port (PDP)</b>	MA V Holster
<b>DC-IN</b>	Connects the MA V to the AC power adapter and wall outlet
<b>FireWire® or iLINK®</b>	Any FireWire® or iLINK® compatible device



*The USB, FireWire® and iLINK® ports are plug-and-play and hot-plug capable which allows you to add or remove devices while the computer is running. The operating system automatically recognizes and configures the new device.*



*The CPU is designed for mobile wear using an attachable clip or optional pouch. For more information, see “Assembling the CPU” on page 33.*

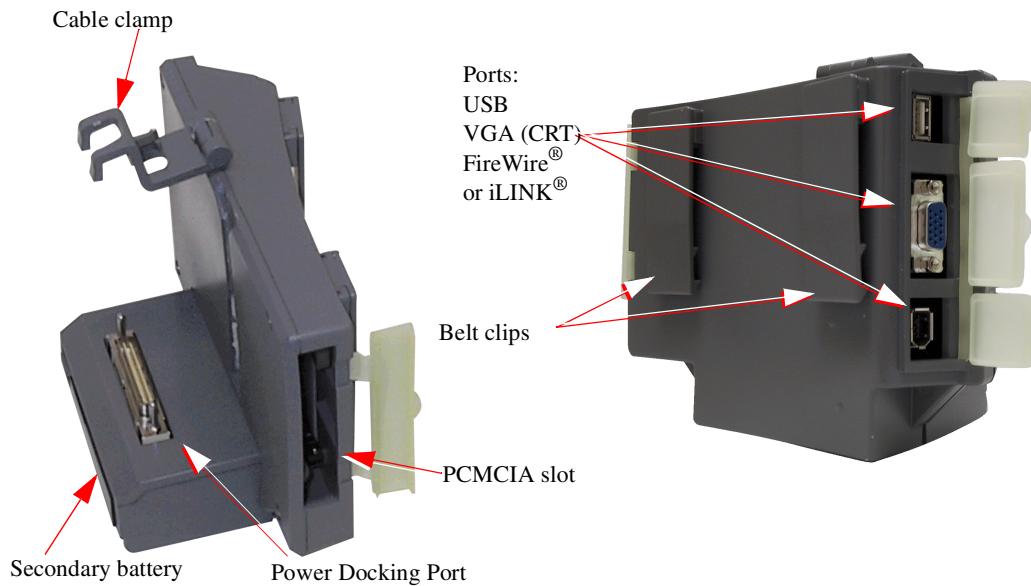
## Power management features

The MA V includes an optimized system BIOS for taking advantage of its power-savings design. The system BIOS allows power sources to be hot-swapped while using the MA V, without the need to shut it down first. The BIOS also includes settings to slow the processor clock as a means of controlling the system's thermal performance and reduced power consumption modes (standby and hibernation mode).

## The MA V Holster

The holster extends the capabilities of the MA V in terms of:

- Longer operating times — a secondary battery that attaches to the Holster adds up to two hours of additional operation. The Holster also allows hot-swapping the battery without first shutting down the CPU.
- Added connectivity options — the Holster has additional ports, including USB, FireWire® or iLINK®, VGA (CRT), and a Type II or Type III PCMCIA card slot.
- Desktop operation — the Holster doubles as a desktop docking station; connect a monitor, AC power, keyboard, and a mouse for optimum desktop use.
- Added wearability — the Holster is designed to be worn on the body. The Holster may be attached to a belt, suspenders, vest, shoulder pack or backpack.



**Front view of the MA V Holster**

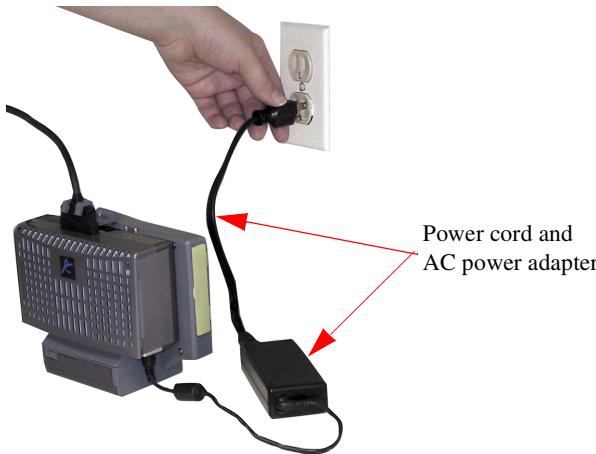
**Rear view of the MA V Holster**

## The Power System

The MA V's power system includes a rechargeable lithium-ion (Li-Ion) battery that attaches to the back of the CPU. Depending on the peripheral devices purchased, you may also have a second Li-Ion battery that attaches to the Holster. Together, the two batteries provide three to four hours of continuous operation, without the need to change batteries.

Using the MA V Holster, you can hot swap power sources without powering down the system. Both the primary and secondary battery are hot swappable.

The MA V's power system also includes an AC power adapter and power cord. The AC power adapter allows you to plug the MA V into a standard wall outlet and operate the MA V while simultaneously charging all installed batteries.



*Working with batteries requires special safety precautions. Refer to "Special Battery Cautions" on page x for special handling.*



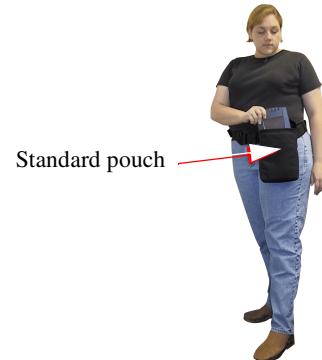
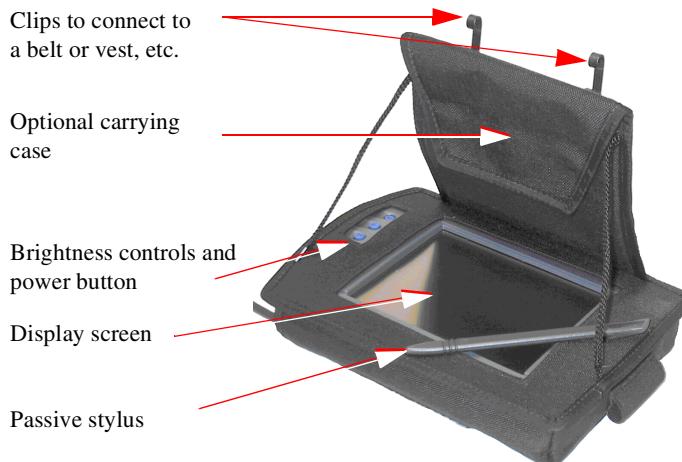
*Refer to page 12 for charging information.*

## The Xyber®Panel Digital Flat Panel Display (FPD)

The FPD is both an input and output device; it acts as a monitor to display information and uses a touch screen interface to input information.

Designed to be body-worn, the FPD comes with a zippered pouch that protects the FPD when it is not in use. An optional carrying case is available that not only protects the touch screen display when it is not in use, but also flips open and supports the FPD while you work with it, without having to remove it from the case.

The FPD is available in a 6.4" or 8.4" viewable display that works in all light conditions, including bright sunlight. The FPD contains brightness control buttons, a power button and connects to the CPU's UIP port.



Refer to “Using the Xyber®Panel Digital Flat Panel Display” on page 21 for directions on using the FPD.

Refer to “Assembling the Xyber®Panel Flat Panel Display (FPD)” on page 36 to assemble the FPD.